

EC900 Series Power Control System

(EC700PSU-CM/EC970 User Instructions for Coachman Motorhomes)

1 Introduction

This section of the handbook will guide you through the operation of the electrical system. All details are correct at the time of publication. For the latest revision of this manual, please visit sargent.zohodesk.eu.

For the safe operation of all electrical equipment within your motorhome, it is important that you read and fully understand these instructions. If you are unsure of any point, please contact your dealer / distributor for advice before use.

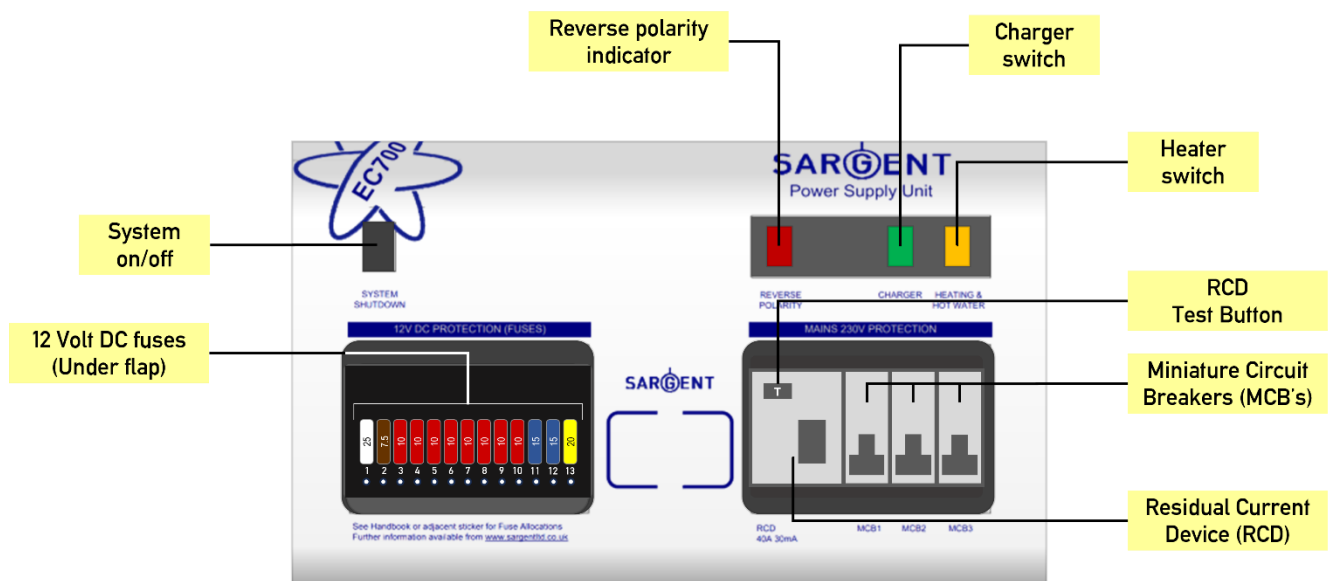
The EC900 Power Control System fitted in this vehicle has a number of key components that you will need to be familiar with before attempting to use the system, these are:

- The EC700PSU Power Supply Unit (PSU) - a combined mains consumer unit and 12V controller located in the bed box or upper locker.
- The EC970 Control Panel (CP) - a remotely located user control panel used to turn circuits on and off and to display battery, water tank and other system information. This panel uses a graphical touchscreen with straightforward controls and reliable data communication to the PSU.
- The PX310 AC-DC Battery Charger - A fan-cooled 300-Watt multi-stage power converter unit that charges the batteries and provides 12V DC power.
- The DXC30-12 DC-DC Charger – A battery to battery charger that can provide up to 30 amps to the leisure battery and uses a 3-Stage profile to ensure fast, efficient charging during driving.
- The LB100S Lithium Deep Cycle Battery – A 100Ah smart lithium battery which provides significant advantages over a traditional lead-acid battery, including reduced weight, longer life, more usable capacity, and faster charging.

2 Using the System

2.1 Power Supply Unit - Component Layout

The PSU is usually located in the front offside upper locker and similar locations.



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2.2 Activating the System

The EC700 Power Supply Unit has a shutdown button that can be used when the vehicle is in storage. This allows the leisure electronics to be turned off when not required to save battery power. When in the off position (button out) the tracking system supply is still active, all other supplies are turned off.

Before using the system, please ensure the system shutdown switch is in the on position (button in) the system is now turned on.

Note: To use Sargent Tracking remote features when a subscription is active via the Sargent Tracking portal, the system must be turned on. For more information see section 4.

2.3 Connecting to the Mains 230V supply and Safety checks

For your safety it is IMPORTANT that you follow these connections instructions each time your leisure vehicle is connected to a mains supply. This section assumes that the system is complete and that a Leisure battery has been installed (see 3.4).

- A) **Ensure suitability of the Mains Supply.** Your leisure vehicle should only be connected to an approved supply that meets the requirements of BS7671 or relevant harmonised standards. In most cases the site warden will hold information regarding suitability of supply. If using a generator, you also need to comply with the requirements / instructions supplied with the generator. Please note that some electronic generators may not be compatible with your leisure system. Further generator operational information is contained in section 3.2.
- B) **Switch the PSU Battery Charger / Power Converter OFF.** Locate the green 'Charger' power switch on the PSU and ensure the switch is in the off position (button out) before connection to the mains supply.
- C) **Connect the Hook-up Lead.** Firstly, connect the supplied hook-up lead (orange cable with blue connectors) to the Leisure Vehicle and then connect to the mains supply.
- D) **Check Residual Current Device operation.** Locate the RCD within the PSU and ensure the RCD is switched on (lever in up position). Press the 'Test' button and confirm that the RCD turns off (lever in down position). Switch the RCD back to the on position (lever in up position). If the test button failed to operate the RCD see section 3.1.
- E) **Check Miniature Circuit Breakers.** Locate the MCB's within the PSU (adjacent to the RCD) and ensure they are all in the on (up) position. If any MCB's fail to 'latch' in the on position see section 3.1.
- F) **Turn the PSU ON.** Locate the black 'Shutdown' button and ensure it is in the ON position (press button in). Locate the green 'Charger' switch on the PSU and turn to the ON position (press button in). The charger switch will illuminate when turned on. The PX310's LCD display will light up to indicate power. If not, ensure the PX310 charger unit's power switch is also in the ON position.
- G) **Check correct Polarity.** Locate the 'Reverse polarity' indicator on the PSU and ensure that the indicator is NOT illuminated. If the indicator is illuminated see section 3.2.
- H) **Check operation of equipment.** It is now safe to operate the 12V and 230V equipment.

2.4 Operation while driving

The Power Control System is designed to shutdown parts of the system while the engine is running. This is to meet Electro Magnetic Compatibility (EMC) regulations and to ensure the safe operation of the motorhome. With the engine running the screen will show a warning 'ENGINE RUNNING'.

Please ensure the system shutdown switch on the PSU is in the on position (button in) before driving (see 2.2). This will ensure the electronic system is active and will therefore be able to control the charging process, supply the refrigerator and monitor other system circuits.

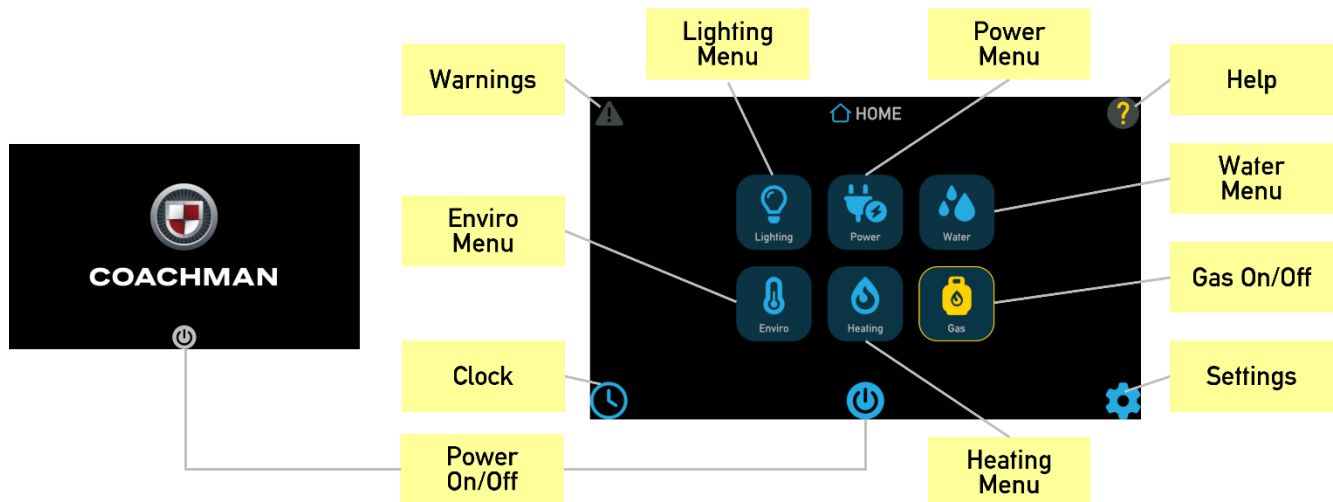
If / when fitted, designated 12V sockets, enroute reading lights and enroute heating will remain operational while the engine is running.

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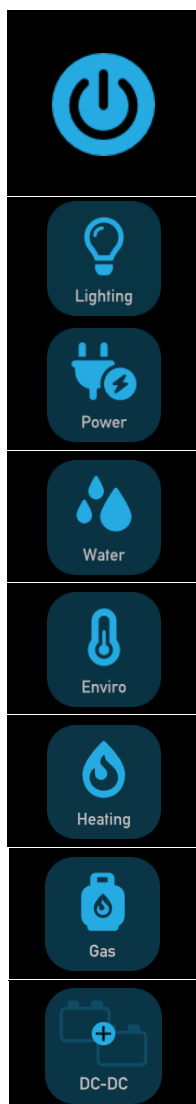
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2.5 Control Panel - Layout

Your EC970 control panel display will have the appearance as below.



2.6 Control Panel – Key Features



Power On/Off Button - After activating the PSU by pressing the System Shutdown button the display will beep twice and show the start-up logo. To activate power to all circuits, press the power on/off button, the panel will beep once. To turn the power off and enter standby mode, press the power button again. Note: If the display has been inactive for some time, the backlight will be switched off to save power. Simply tap the screen to restore normal brightness.

Lighting Menu - Press the lighting button to show the lighting control screen. Here you can turn on / off or adjust the dimmable lighting levels.

Power Menu - Press the power button to show the power information and control screen. Here you can view leisure/vehicle battery condition, and check battery charger and solar charger currents.

Water Menu - Press the water button to show the water tank information and control screen. Here you can view tank levels and control related features.

Environmental Menu - Press the enviro button to show the internal and external temperature in degrees Celsius. Also shown is the internal relative humidity.

Heating Menu - Press the heating button to show the heating control screen. Here you can control the water and space heating systems, select energy and temperature and set related timers.

Gas button - Press the gas button to enable gas supply to the leisure equipment, such as heating system, oven and hob.

DC-DC Charger Menu – Available when the engine is running, press the DC-DC button to show the battery-to-battery charging information.

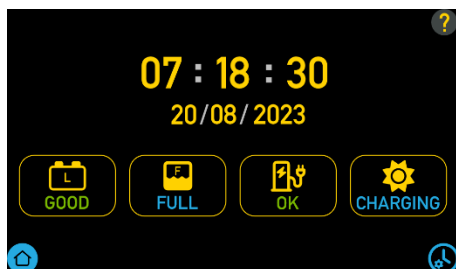
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	Warnings button - The system incorporates a number of warnings, for example if the battery becomes low. When a warning is active a warning screen will appear along with an audible beeping sound. Until the warning has been fully cleared, the warnings indicator will remain red. Press the indicator to view any active warnings.
	Help button - Press the help button to display the context sensitive help screens. These will provide more detail about how to use the currently selected screen.
	Clock button - Press the clock button to display the current time in 24hr format. This screen also provides a quick summary of the leisure battery and fresh water tank status.
	Settings button - Press the settings button to show the general settings screen. Here you can set the date & time, screen brightness, screen on-time, key beep etc. Press the home button to return to the main screen.
	Advance button - Pressing this button will advance to the next main section, for example to move between Lighting, Power, Water and Enviro screens.
	Next button - Pressing this button moves to the next screen within a section, for example to move between the various Power screens.
	Home – Pressing this button will go back to the Home screen.

2.7 Clock / Status Screen

Clock screen - This screen not only displays the current time and date but also provides status tiles for the main services in the vehicle such as leisure battery, fresh water tank, 230V mains and solar charging.

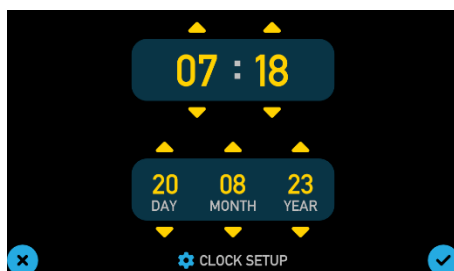


	Leisure Battery – The charge status is shown GOOD – No charge required FAIR – Charge recommended POOR – Charge immediately CHARGING – Charger is switched on DISCONNECTED – No battery detected
	Fresh Water (if fitted) - The water tank level is shown FULL – 100% GOOD – 50% to 99% LOW – 25% to 49% EMPTY – less than 25%
	230V Mains – The mains supply status is shown OK – Mains current normal HIGH – Mains current over 75% capacity LIMITING – Current limiting activated INACTIVE – Mains 230V power off
	Solar Charging – The solar panel charging status is shown CHARGING – Battery charging from solar INACTIVE – Not charging or panel not fitted
	Clock Setup – Press this button to access the clock setup screen

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Clock setup – Use this screen to set the current time and date.



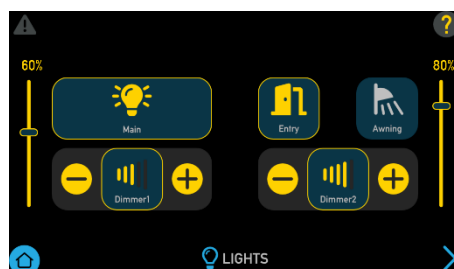
	Set Time/Date – Use the up / down arrows to set the required time and date
	Confirm settings – Use the tick to confirm the settings or cross to cancel the settings

Note: The clock has a power backup, which can retain the clock settings for a number of weeks. If the vehicle has been stored for longer than this with no 12-volt power, the clock may need to be reset.

2.8 Lighting Operation

The main interior lighting, entry, awning and dimmer lights can be switched on or off from the control panel or their respective physical switches in the vehicle.

Lights screen - Here you can turn on / off lights or adjust the dimmable lighting levels.



	Main Lights - Press to turn the main interior lighting circuits on or off
	Entry Light – Press to turn the entry door lighting on or off
	Awning Light – Press to turn the awning light on or off
	Dimming Levels - To change either dimming level, drag its respective slider to the required level, or press the respective +/- buttons The dimming level is shown as a percentage above the slider, and within the dimmer icon

2.9 Power Management

The status of the leisure and vehicle batteries can be viewed on the control panel display by selecting the Power menu.

Pressing the *Next Button* will switch between 12V battery power, Lithium+ (extra leisure battery information) and 230V mains power screens.

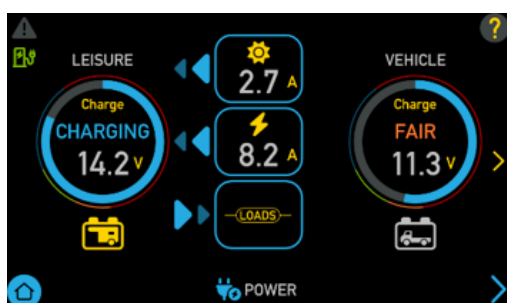
The EC700 PSU incorporates a built-in solar charge management feature, which will monitor the input from a separate solar panel and regulator if fitted. The current produced from the solar regulator is displayed along with an indication of which battery is being charged.

Depending on the charge state of the batteries, the solar power will be directed to the required battery and continuously monitored to ensure optimum operation.

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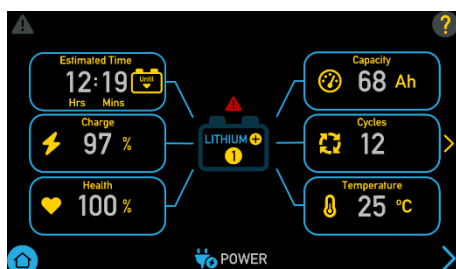
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Power screen (12V) - Here you can view battery levels, along with charger and solar current.



	Selected Battery - Use the select battery button to choose which battery you wish to use or charge with the 230V charger
	Battery Condition – the battery voltage will be displayed and the battery condition GOOD – No charge required FAIR – Charge recommended POOR – Charge immediately CHARGING – Charger is switched on DISCONNECTED – No battery detected
	Mains Charger Current – If the mains charger is providing charge, the current will be shown along with an arrow indicating which battery is being charged
	Solar Charger Current – If the solar panel is providing charge, the current will be shown along with an arrow indicating which battery is being charged
	Appliance Loads – An arrow will show when the selected battery is supplying power to the loads. If the mains charger is switched off, the load current will also be shown
	Mains On – Indicates mains power is present and battery charger is on

Lithium+ Power screen (12V). As a Sargent **LITHIUM+** battery is fitted, a second screen will be available with more information about the battery. Press the yellow arrow to see the Lithium+ screen.



	Time Remaining – This tile will display the predicted time remaining before the battery is fully discharged or fully charged (as shown by the direction arrow)
	Battery Charge – This tile shows the State of Charge of the battery 50-100% – No charge required 25-49% – Charge recommended 0-24% – Charge immediately
	Battery Health – This tile shows the State of Health, which represents how the battery is aging over time. If the battery health is below 50% on a fully charged battery, consider replacing the battery
	Battery Capacity – This tile shows the remaining capacity of the battery in Ampere Hours. For a new battery the fully charged capacity will be the rating on the battery label e.g., 70Ah, this will gradually reduce as the battery ages

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	Cycles – This tile shows how many charge / discharge cycles the battery has completed
	Temperature – This tile shows the internal temperature of the battery
	Battery Indicator – This indicator shows which lithium battery is selected. If two LITHIUM+ batteries are fitted, press this button to see data from the second battery
	Error Indicator – This indicator only lights if there is a problem communicating with the battery. If this happens check the battery communication cable is securely fitted at both ends

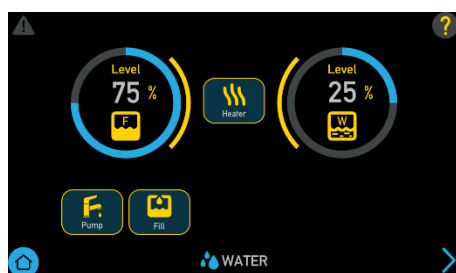
2.10 Water System Operation

The EC970 control panel pump button operates the internal water pump drawing water from an on-board tank if fitted, or an external container when no tank is fitted.

The water tanks (fresh & waste) incorporate a level warning feature to warn the user when the fresh water level drops below 25% or when the waste water level reaches 100%. These warnings can be enabled / disabled from the *User Settings* screen.

A warning beep and message will display if either of these occur with the pump enabled. This can be muted by pressing the bell icon displayed. These warnings will not be repeated unless the water pump power switch is turned off and on again. This is to ensure the warning does not become a nuisance.

Fresh/Waste Water Tank screen - Here you can view the on-board fresh and waste water tank levels and control water tank related features.



	Water Pump - Press this button to turn the water pump on. Press the button again to turn the pump off. The button will illuminate when the pump is on.
	Tank Fill - Press the tank fill button to turn on / off the filling of the on-board water tank from the external water container. The pump will turn off automatically when the on-board tank is full or after 7 minutes have elapsed.
	Tank Heaters Button - Press this button to turn on / off the water tank heaters.

2.11 Environmental Readings

The EC970 system uses two sensors to measure internal temperature/humidity and external temperature. The combined internal temperature and humidity sensor is furniture-mounted within the motorhome, and the external sensor is mounted below the motorhome floor.



	Internal – The internal temperature and humidity is shown along with a bar graph
	External – The external temperature is shown along with a bar graph

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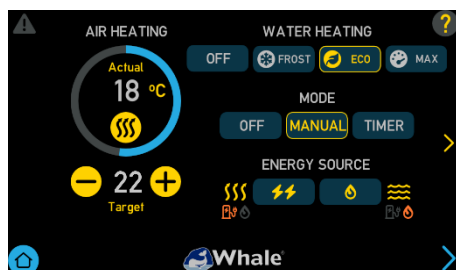
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2.12 Whale Heating Controls

The heating system can be controlled via the Heating screens shown below.

Heating screen – On this screen you can control the heating system, such as setting target temperature, change modes, and select the energy sources.

Press the *Next Button* to go to the Timer screen to set the related timers.



	Actual Temperature – The current temperature is shown along with a dial
	Air Heating – Press the button to cycle through the preferred mode for space heating Normal – Heats towards target temp Frost – Maintains approx. 5°C Night – Maintains approx. 16°C Fan – Circulates air without heating
	Target Air Temperature – To set the required temperature for Air Heating, press the (+) and (-) buttons Minimum – 5°C Maximum – 30°C
	Water Heating – Select the preferred mode for water heating OFF - Turn water heating off FROST – Use frost protect setting ECO – Use economy hot-water setting MAX – Use high hot-water setting
	Mode – Select the preferred operation for both heating systems OFF - Turn both heating systems off MANUAL – Use screen controls TIMER – Follow timers on Timer screen
	Energy Source (Air Heating) – Press the button to cycle through the available energy choices for air heating OFF – No source Gas – Use gas source Elec 1 – Use Elec 1 source Elec 2 – Use Elec 2 source Elec 3 – Use Elec 3 source Mix 1 – Use gas + Elec 1 sources Mix 2 – Use gas + Elec 2 sources Mix 3 – Use gas + Elec 3 sources

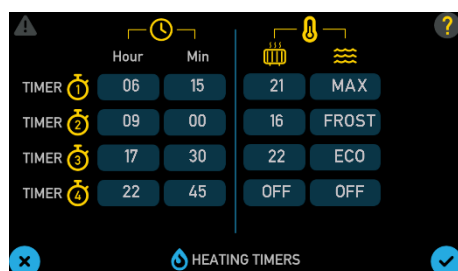
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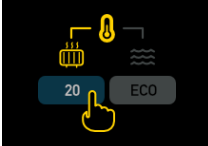
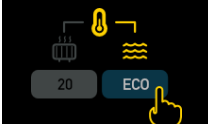
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	Energy Source (Water Heating) – Press the button to cycle through the available energy choices for water heating OFF – No source Gas – Use gas source Elec 1 – Use Elec 1 source Elec 2 – Use Elec 2 source Elec 3 – Use Elec 3 source Mix 1 – Use gas + Elec 1 sources Mix 2 – Use gas + Elec 2 sources Mix 3 – Use gas + Elec 3 sources
	Mains On – Indicates mains power available to specific heater for Elec sources
	Gas Flame On – Indicates gas flame is lit for specific heater

Note: To enable gas power, ensure the Gas button is set to ON on the Home screen.

Heating timer screen - On the Heating screen detailed above, press the yellow arrow to set or view the daily heating timers. Timers will use the set energy source for each heater on the Heating screen.



	Timer - Press on the Hour or Minute values to change the setting Timers should be set in order during the day (Timer 1 the earliest and Timer 4 the latest) and use the 24-hour clock
	Air Heating Setting - Press the temperature values to change the setting Each press will increment the value from Off, then 5°C through to 30°C
	Water Heating – Select the preferred mode for water heating for the set time OFF - Turn water heating off FROST – Use frost protect setting ECO – Use economy hot-water setting MAX – Use high hot-water setting

Note: Mode button on the Heating screen must be set to TIMER in order for the timers to control the heating appliance.

2.13 Smart Charging

The EC700 PSU incorporates a smart charge feature, which monitors the leisure and vehicle batteries and automatically adjusts and directs the charger power and/or solar power to maintain the leisure and vehicle batteries at an optimal level.

If the vehicle is on hook-up and the charger is on, the solar power by default will be directed to the opposite battery.

Note: If the vehicle battery is isolated using the Fiat ignition key isolator or similar, some smart charging functionality will be lost, and the available charge will be directed to the leisure battery.

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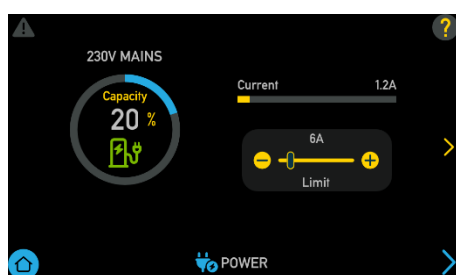
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2.14 AC Current Limiter Operation

The Power Control System features a 230V current monitoring system which allows the mains hook up current to be displayed on the control panel. The resolution of this reading is 0.5A. A current limit can be set based on the available site hook-up supply. The capacity value and the dial show how much of the available AC power is currently being used, to help manage power and avoid tripping of the site post.

This feature is particularly useful when abroad on a low current supply. Setting the value to OFF will disable this feature.

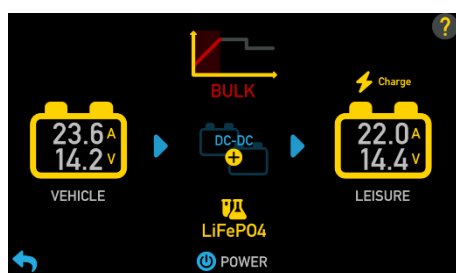
Power screen (230V) - Here you can view the 230V current and set the 230V current limiter.



	AC Capacity - A dial shows the percentage of available AC current being used. An indicator also shows the limit status Green=OK, Orange >75%, Red=Over Limit Note: If the limit setting is OFF, the capacity will be based on the maximum site supply of 16 Amps being available
	AC Current – The bar graph shows the 230V AC current being used by the vehicle (from the site hook-up)
	Set Limit - To set a limit, either press the (+) or (-) buttons or drag the slider until the required limit level is reached

2.15 DC-DC Charger

When the engine is running, the control panel will display a button to view the **DC-DC** DC-DC charger information and battery information.



	Charging Stage – Shows the DC-DC charger's charging stage (see section 3.3) BULK – DC-DC in bulk charge BOOST – DC-DC in boost charge FLOAT – DC-DC in float charge
	Battery Status – Shows charging amps and voltages of each battery
	Charging Stage – Shows the current selected battery chemistry on DC-DC charger

2.16 Electric Step Operation

On vehicles fitted with an electric step, this is operated by a button near the entry door. Press and release the button to move the step in or out. One press of the button will move the step out; a further press will move the step in again.

If the engine is started the step will move in automatically, after a short warning buzzer. If this operation fails due to an obstacle a buzzer will sound continuously to warn that the step is still out, and therefore requires your attention.

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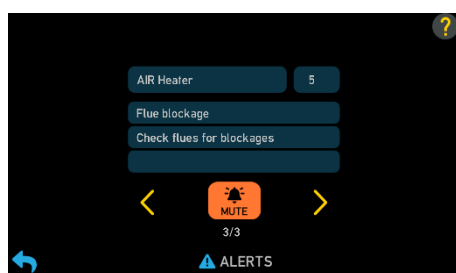
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2.17 System Warnings

The system incorporates a number of alerts and warnings that are active at specific times. These are summarised in the table below and also covered by relevant sections of this manual.

Warnings will appear on the screen when produced, and can be accessed using the warnings button in the top left of any screen.

Warnings screens - When a warning is active a screen will appear on the control panel screen containing a description of the warning along with an audible beeping sound.



	Warning Heading – Shows related heading the warning(s) fall under. If an error code is provided (by an appliance) it will be shown next to the heading
	Warning Details – Shows warning(s) and assisting information if provided
	Mute Button – To mute the warning sound, press the Mute button under the warnings list. The icon will then become Grey and the sounder will stop. The warning will remain until it is fully cleared, for example by re-filling the water tank or re-charging the battery
	Safety Icon – Some warnings cannot be muted and will remain until fully cleared, for example by removing hook-up lead when engine on
	Next warning – Shows next warning screen if multiple warnings are active

Power Control System Warnings

Heading	Warning	When	Type
FRESH WATER	Fresh Tank Below 25%	With pump turned on and fresh water level low (less than 25% full)	
WASTE WATER	Waste Tank Full	With pump turned on and waste water level full	
LEISURE BATTERY	Battery Voltage Low	With control panel power on and leisure battery selected (as active battery), charge level below 15%	
LEISURE BATTERY	Battery Voltage Very Low	With control panel power on and leisure battery selected (as active battery), charge level below 5%*	
LEISURE BATTERY	Battery Voltage Too High	Leisure battery is selected (as active battery), voltage level above 15V	
VEHICLE BATTERY	Battery Voltage Low	With control panel power on and vehicle battery selected (as active battery) and the voltage level is below 11.3V	
VEHICLE BATTERY	Battery Voltage Very Low	With control panel power on and vehicle battery selected (as active battery) and the voltage level is below 10.9V*	
VEHICLE BATTERY	Battery Voltage Too High	Vehicle battery is selected (as active battery), voltage level above >15V	

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CAN BUS	No CAN Bus Detected Check PSU & Control Panel Wiring	No CAN bus is detected at control panel CAN bus lead from PSU to control panel should be inspected for disconnection or faults
CAN BUS	No CAN Bus Detected Leisure Battery Critical	With control panel power on and leisure battery selected (as active battery) and the voltage level is below 9V, and no CAN bus detected at control panel System will shut down after 30 seconds to protect battery
CAN BUS	No CAN Bus Detected Vehicle Battery Critical	With control panel power on and vehicle battery selected (as active battery) and the voltage level is below 10V, and no CAN bus detected at control panel System will shut down after 30 seconds to protect battery
MAINS SUPPLY	Mains Lead Connected	When the engine is started and the mains cable is still plugged in and the charger is switched on
ENTRY STEP	Engine Running Step Is Extended	Step extended and engine started Step jammed or obstructed



* Note: This is an emergency cut off level to protect the battery from severe damage. You should not rely on this cut off level during normal operation, but manage your power consumption to a discharge level of Leisure 20% or above / Vehicle 11.5V or above. This cut off only applies to power drawn from the battery by the leisure equipment that is controlled by the control panel power switch; it will not protect the battery from discharge by permanently connected equipment.

Whale Heating Warnings

Heading	Warning	Type
AIR/WATER Heater – Code 1 or 7	Inadequate gas supply Check gas supply	
AIR/WATER Heater – Code 2,3 or 11	Overheat Protection Check vents/ducts clear Wait 10 mins to cool down	
AIR/WATER Heater – Code 4	Inadequate supply voltage Supply: 10.5-16V d.c.	
AIR/WATER Heater – Code 5	Flue blockage Check flues for blockages	
AIR/WATER Heater – Code 6, 8, 9 or 10	Internal fault UK: Call Whale support EU: Call Webasto support	
AIR/WATER Heater – Code 15	Multiple faults Power off; check repeat faults; power on	

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2.18 User Settings

The EC970 control panel has a number of user settings, which can be accessed by pressing the User Settings button. This screen also displays the software version number of the PSU, Control Panel and the communicator / tracking unit details, if a Sargent EC680 Communication Unit is fitted.

User Settings screen - Here you can set the key beeps, screen brightness, screen on time etc.

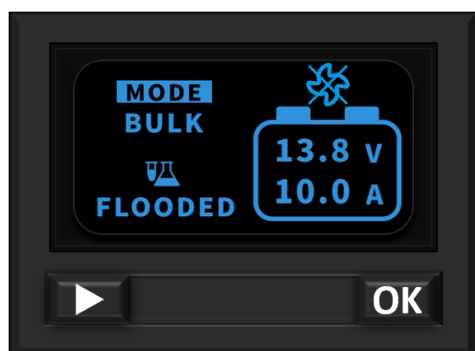


	Settings – Use the arrows to select the setting to adjust, then adjust the setting below as required. Once all required settings have been made, press <i>Tick Button</i> to confirm (see table below for more detail)
	Bluetooth Pairing - This feature is for future use and not currently supported.

Section	Possible Settings	Description
Key Beep	On / Off	Turn the key beep sound on or off
LCD Brightness	10% to 100%	Adjust screen brightness
Backlight Time	30 seconds to 90 minutes	Adjust time before screen backlight goes off
Water Alarms	On / Off	Turn the water alarms beep sound on or off
Lighting Mode	None / Lights / Lights & Dimmer	Sets lighting behaviour when control panel is switched on, None – Lights stay off Lights – Lights come on Lights & Dimmer – Not used

2.19 Battery Charger - Layout

The battery charger unit incorporates its own LCD display that shows useful information about the battery charging status and also allows the charger settings to be configured.



	Charging Mode – Shows the current charging stage (see section 3.3) BULK – Charger in bulk charge BOOST – Charger in boost charge FLOAT – Charger in float charge PSU – No load detected, acting as power supply to 12V circuits
	Battery Chemistry – Shows the selected battery type to modify charge voltages
	Fan Mode – Shows the current fan mode Normal – Standard charging Silent – Charger in Silent Mode, charger output restricted to max 5 Amps
	Charger Output - Shows charging amps and voltages of the charging battery

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Before using the charger, the correct battery type should be set from the LCD display. After switching on charger, press OK button for 3 seconds to enter Setup Mode, the battery type should then start to flash. Press the select button to change battery type, then press OK to confirm. This will then display the selected battery chemistry on the LCD display.

In order to restrict noise (for example at night) the fan can be put into Silent Mode. In this mode the fan will always be off but the charger output will be restricted to a maximum of 5 Amps. During charging press the select button for 3 seconds to enter Silent Mode.

Press the button again to exit Silent Mode. The charger will also exit the Silent Mode when the charger is turned off then on again, or 12 hours have passed.

For more information and to view the PX310 handbook, please visit the Knowledge Base article.

<https://sargent.zohodesk.eu/portal/en/kb/articles/px310>

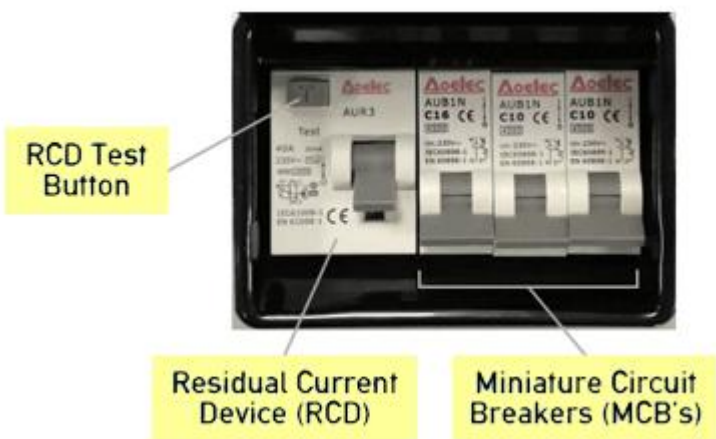


3 System Technical Information

The following section provides further technical information relating to the electrical system. You can also access the supporting technical manuals from sargent.zohodesk.eu.



3.1 Residual Current Device & Miniature Circuit Breakers



The Residual Current Device (RCD) is basically provided to protect the user from lethal electric shock. The RCD will turn off (trip) if the current flowing in the live conductor does not fully return down the neutral conductor, i.e., some current is passing through a person down to earth or through a faulty appliance. To ensure the RCD is working correctly, the test button should be operated each time the vehicle is connected to the mains supply (see section 2.3).

The Miniature Circuit Breakers (MCB's) operate in a similar way to traditional fuses and are provided to protect the wiring installation from overload or short circuit. If an overload occurs the MCB will switch off the supply. If this occurs you should investigate the cause of the fault before switching the MCB back on.

The following table shows the rating and circuit allocation for the three MCB's:

MCB	Rating	Description
1	10 Amps	230V Sockets
2	16 Amps	Extra 230V Sockets / Heating System
3	10 Amps	Water Heater / Battery Charger

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3.2 Generator Usage

Caution should be used before connecting a generator to your motorhome.

WARNING

Never start or stop the generator while electrical loads are connected and switched on. Start the engine, let it stabilise and then connect the electrical load. When stopping the generator, disconnect the electrical load and let engine stabilise before switching off.

Whilst some generators use electronic inverter technology, others use a more basic principle to generate the 230V supply. Preference should be to choose a generator which produces a consistent sinusoidal wave form with accurate voltage control.

The Reverse Polarity warning light on the PSU may illuminate when using a Generator. This is a normal side effect when using some types of generators. Instead of connecting the neutral conductor to earth, some generators centre-tap the earth connection making both neutral and live conductors 110V above earth. This 110V difference causes the neon polarity indicator to illuminate.

In most cases it is safe to use a generator, but please consult the generator handbook for further information.

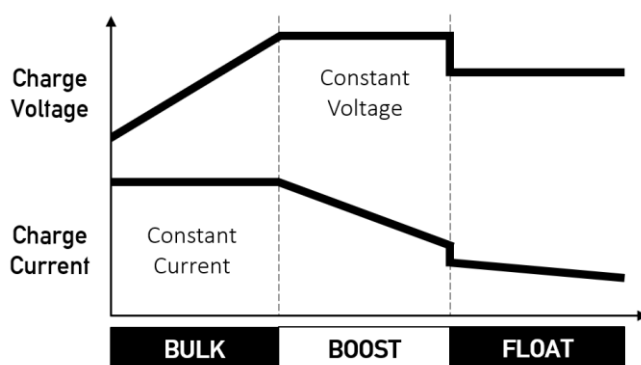
3.3 Battery Chargers

WARNING

Under heavy loads the Battery Charger case may become hot. ALWAYS ensure the ventilation slots have a clear flow of air. Do not place combustible materials against / adjacent to the charger.

The PX310 and DXC30-12 chargers both feature 3-stage charging profiles.

During the bulk charge, the battery voltage is increased gradually while the current is limited to start the charging process and protect the battery. At stage 2 the voltage rises to deliver the bulk charge to the battery. When the battery is charged, the voltage is decreased at stage 3 to deliver a float charge to maintain the battery in the fully charged state.



State	Description
Bulk	The battery is charged with maximum current, whilst the voltage climbs steadily, until the boost voltage setting is reached.
Boost	The battery voltage is held constant while the current gradually decreases, until the battery is becoming full. By default, the boost stage will not exceed 8 hours to prevent overcharging.
Float	The voltage of the battery will reduce to the float voltage setting and current will reduce to a trickle charge to help offset any self-discharge.

The PX310 provides power to the leisure equipment when the mains supply is connected. This module supplies DC to the leisure equipment up to a maximum of 25 Amps (300 Watts); therefore, the available power is distributed between the leisure load and the battery, with the leisure load taking priority as per the following example:

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Leisure load	Available power for battery charging
5A	20A
10A	15A
15A	10A
20A	5A

3.4 Leisure Battery

WARNING

Use caution when removing or replacing the leisure battery. Batteries can cause severe injuries and damage when handled incorrectly, please take into account that the weight of the installed battery may be in excess of 10kg. In addition, caution should always be taken when operating equipment containing high-capacity energy storage devices.

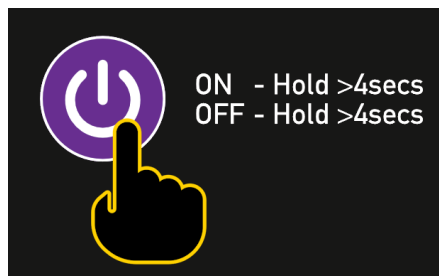
Your motorhome is fitted with an LB100S **LITHIUM** leisure battery. Due to the construction of this battery, it is not necessary to vent the battery to the outside, and there is no requirement to check and maintain electrolyte levels.

WARNING

For your own safety, do not store anything other than the leisure battery in the battery storage area.

To reduce long term discharge of the cells such as when the vehicle is in storage, the LB100S can be set into Sleep Mode, greatly reducing self-discharge.

To manually switch the battery in to Sleep Mode, press and hold the power button on the top of the battery for at least 4 seconds. This will isolate the battery cells and no power will be present at the terminals.



Without a load (e.g. if the Power Control System is turned off via the System Shutdown button) the battery will also automatically enter Sleep Mode if no activity is detected for 30 minutes and voltage is low.

The battery can exit Sleep Mode by charging the battery, activating the Power Control System, or by pressing the power button for 4 seconds.

For more information and to view the LB100S handbook, please visit the Knowledge Base article.

<https://sargent.zohodesk.eu/portal/en/kb/articles/lb-series-lithium-batteries-with-can-bus>



A) Installation & Removal

Always disconnect the 230V mains supply and turn the PSU green charger switch to the off position (button out) before removing or installing the battery. Note the LB100S data cable in the top of the battery must be connected when the battery is installed for battery readings to display on the control panel.

When connecting the battery, ensure that the correct polarity is observed (black is negative [-] and red is positive [+]) and that the terminals are securely fastened. Crocodile clips must not be used.

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Note: If a Sargent Tracking subscription is active, it is advised to set the vehicle into Service Mode (Tracker > Info > Remote Actions > Set Service Mode) or contact the tracking station on +44 3456 027302 before removing the battery to avoid an unnecessary security call.

WARNING

Explosive gases may be present at the battery. Take care to prevent flames and sparks in the vicinity of the battery and do not smoke.

B) Operation / Servicing

Under normal circumstances it should not be necessary to remove the battery other than for routine inspection of the terminals.

Note: Do not over discharge the battery. One of the most common causes of battery failure is when the battery is discharged below the recommended level of approximately 11V (5%). Discharging a battery below this figure can cause permanent damage to one or more of the cells within the battery.

To prevent over discharge, both the Power Control System and the LB100S's battery management system incorporate a battery protect function that warns the users and then isolates the batteries when they fall below set values.

If a warning is active a beep will be emitted by the control panel and information will be shown on the screen. To mute the warning, press the bell icon. These warnings will not be repeated unless the power switch is turned off and on again. This is to ensure the warning does not become a nuisance.

Battery	Cut off	Action after cut off	Notes
Vehicle	10.9V	Battery selection is changed from vehicle battery to leisure battery. If the leisure battery is below 9V (5%) then a further warning will occur (see below).	This cut off level is designed to protect the vehicle battery from over discharge. The 10.9V level ensures there is sufficient power in the battery to run the vehicle electronics and start the vehicle. This cut off only applies to power drawn from the battery by the leisure equipment; it will not protect the battery if you leave vehicle circuits switched on, such as the road lights
Leisure	11V (5%)	Power is turned off	This is an emergency cut off level to protect the battery from severe damage. You should not rely on this cut off level during normal operation, but manage your power consumption to a discharge level of about 12V (15%) This cut off only applies to power drawn from the battery by the leisure equipment that is controlled by the control panel power switch; it will not protect the battery from discharge by permanently connected equipment.

3.5 12 Volt DC Fuses

WARNING

When replacing fuses always replace a fuse with the correct value. NEVER replace with a higher value / rating as this could damage the wiring harness. If a replacement fuse 'blows' do not keep replacing the fuse as you could damage the wiring harness. Please investigate the fault and contact your dealer.

The following table shows the fuse allocation for the 13 fuses fitted to the PSU. Please note that fuses are dependent on PSU versions, so not all fuses may be present.

Fuse	Rating	Fuse Colour	Description
1	25 Amps	White	Spare
2	7.5 Amps	Brown	Permanent 12V
3	10 Amps	Red	12V Sockets

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4	10 Amps	Red	Ignitors / Gas Solenoid
5	15 Amps	Blue	Fridge
6	10 Amps	Red	Pumps / Tank Heaters
7	10 Amps	Red	Main Lights (Rear) & Dimmer Channel 1
8	10 Amps	Red	Main Lights (Front) & Dimmer Channel 2
9	5 Amps	Tan	Awning / Entry Light
10	10 Amps	Red	En route / Electric Step
11	15 Amps	Blue	Spare
12	7.5 Amps	Brown	Spare
13	5 Amps	Tan	Electric Step D+
14	15 Amps	Blue	Solar fuse (Rear fitted)

Note: Fuses (2-13) have a Red LED below them which provides indication that the fuse has blown.

The following table shows details of the fuse located at the Leisure battery.

Fuse	Rating	Fuse Colour	Description
Battery	30 Amps	Green	Fuse remotely located near battery

3.6 Common Fault Table

Fault	Possible Cause	Proposed Fix
No 230-volt output from PSU	Connecting lead between the site and Leisure Vehicle not connected	Check and connect lead as per 2.3C
	RCD switched off	Reset RCD as per 2.3D
	RCD not operating correctly	Check supply polarity; if the RCD continues to fail contact your Dealer as there is probably an equipment or wiring fault
	MCB switched off	Reset MCB by switching OFF (down position) then back ON (up position), if the MCB continues to fail contact your Dealer as there is probably an equipment or wiring fault
	No or deficient supply from site	Contact site Warden for assistance
	Another fault	Contact your Dealer
Reverse Polarity light is illuminated on PSU	Mains Supply reversed?	The reverse polarity light is designed to illuminate when the Live and Neutral supply has been reversed / crossed over. If the light illuminates there is a problem with the site supply or the cable connecting the supply to your vehicle. The light is designed to work on UK electrical supplies (where the neutral conductor is connected to earth at the substation). If you are using your vehicle outside the UK this light may illuminate when no fault exists. In these cases, consult the site warden for advice

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Fault	Possible Cause	Proposed Fix
	Generator being used	'The Reverse Polarity warning light is on when using my Generator'. This is a normal side effect when using some types of generators. Instead of connecting the neutral conductor to earth, some generators centre-tap the earth connection making both neutral and live conductors 110V above earth. This 110V difference causes the neon polarity indicator to illuminate. In most cases it is still safe to use the generator, but please consult the generator handbook for further information
Control Panel Problems	Control Panel has no display	Check batteries and fuses, turn PSU isolate switch and charger switch on and ensure mains supply is connected Check control panel connecting lead at PSU and behind Control Panel Contact your Dealer
	12V Power turns off	Battery protect feature has operated to protect the Vehicle battery and or the Leisure battery. See 3.4C Over voltage protection has been activated, the control panel will display a warning. A number of things can cause this but the most common is the solar panel, it is worth checking the regulator is connected correctly and operating within the correct parameters Engine has been started; all equipment has been disconnected to meet EMC requirements. See 2.4
	Control Panel locked / erratic function	Observe control panel handling instructions. Control panel software may have crashed. Reboot control panel by turning off the PSU isolate switch. Wait 30 seconds then turn the switch back on. Check with your dealer that your system has the latest software installed, as an update may be available
No 12-volt output from PSU	No 230V supply	Check all above
	Charger not switched on	Turn charger switch on, switch will illuminate
	Battery not connected and / or charged	Install charged battery as per 3.4
	Power button on control panel not switched to on	Turn power on at control panel
	Battery flat / Battery fuse blown	Recharge battery, check fuses, check charging voltage is present at battery
	Fuse blown	Check all fuses are intact and the correct value fuse is installed as per fuse table
	Equipment switched off / unplugged	Check equipment is switched on and connected to the 12V supply
	Another fault	Contact your Dealer
Pump not working	Fuse blown	Replace fuse with correct value as per fuse table
	Pump turned off	Turn pump on by pressing the pump button at the control panel
Lights not working	Fuse/s blown	Replace fuse with correct value as per fuse table
	Lights turned off	Turn Lights on by pressing the lights button, use dimmer at the control panel

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3.7 Technical Support

If you require technical support on any Sargent products covered in this manual, please visit the Sargent Customer Support portal at sargent.zohodesk.eu.

In the Knowledge Base you can view product documentation and search frequently asked questions and in the Ticket section you can raise a ticket to request help from the support team.



3.8 Updates

From time to time there may be updates to the system firmware; these updates will be done at service intervals by your dealership.

4 Sargent Tracking & Remote Control

4.1 Sargent Tracking

The vehicle is supplied with a pre-installed tracking and communication unit which is Thatcham Category S5 approved. Two Driver ID tags are provided alongside a security pouch and a Sargent Tracking manual.

In order to activate the features of Sargent Tracking, register an account at sargenttracking.co.uk and confirm your account via the activation email which is sent.

Once done, scan the provided QR code on your supplied Sargent Tracking manual to link your vehicle tracker to your account.

After the tracker has been paired to your account, you will need to purchase either a Standard subscription or a Tracking subscription when prompted on the portal.



4.2 Subscriptions

Subscriptions can be purchased for 1, 2 or 3 years. Standard subscriptions can be upgraded to Tracking subscriptions if required.

For the costs of subscriptions, please visit <https://sargenttracking.co.uk/help>.

Standard Subscription - This provides basic vehicle location (start / stop locations) and system monitoring, including battery levels. The tracking unit is connected to the Power Control System at manufacture and as such also has the following features:

- Remote monitoring of leisure system levels, like battery voltage, tank levels, temperatures and internal humidity
- Remote control of external and internal lighting and the heating system
- Remote alerts to notify you when events occur and action is required. These include vehicle and leisure battery alerts, frost alerts, and alarm alerts if a compatible alarm system is connected

Tracking Subscription - This subscription includes all of the above Standard subscription features, plus:

- Unique Trip recording and viewing
- Additional geofence, towing and system disconnect alerts
- Use of unique driver ID tags to arm/disarm the geofence
- Thatcham approved proactive vehicle tracking and theft monitoring via 24/7 monitoring station

4.3 Operation

The EC680 tracking system is easy to operate as it is controlled by the vehicle's ignition in conjunction with driver ID tags.

Before turning the ignition on, please ensure a tag is present within the vehicle. For caravans there may also be a nominated location for the tag and a suitable hook is provided for this.

For added security when your ID tag is away from the vehicle a 'signal blocking' pouch is provided. When the tag is inside of the pouch the tag is effectively disabled and will not work.

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Where the driver ID tag is attached to the vehicle key(s), theft of the vehicle with the key(s) will not send a theft alert to the monitoring station.

Please check your insurance Terms and Conditions in order to ensure you have insurance cover if the vehicle is stolen by these means. In this scenario, it is your responsibility to report the theft to the monitoring station. You may wish to keep the driver ID tag and your vehicle key(s) separate.

4.4 Reporting a Theft

In an emergency theft situation please contact the tracking monitoring station on +44 3456 027302.

The station operates 24 hours a day, 7 days a week.

Before contacting them, please ensure you know your vehicle tracker details, which can be viewed on the Sargent Tracking portal (Tracker > Info > Tracker Details).

For more information regarding Sargent Tracking please read the provided Sargent Tracking manual or visit <https://sargenttracking.co.uk/help>. An online manual copy is also available in the sidebar of the portal.

5 Technical Data & Approvals

5.1 Equipment – EC700PSU, EC970, EC680, PX310 & DXC30-12

Outline Specification		
INPUT 230V	230 Volts / 0 to 16 Amps	+ / - 10%
OUTPUT 230V	RCD protected, 2 x MCB outputs of 10A & 1 x MCB output of 16A Separate switched channels for heating system and charger	
INPUT 12V	2 x 20A battery inputs via 2 x 4-way connectors	
SOLAR INPUT	1 x Dedicated solar panel input capable of supporting 15A of solar power input (typically 180 to 200W) via a 2-way connector	Check the solar panel rating plate to ensure the maximum current is <= 15A
OUTPUT 12V	25A total output via multiple switched channels protected by 13 fused outputs	
CHARGER INPUT	Input 220-240 Volts AC +/- 10%, Frequency 50 Hz +/- 6%, Current 3A max DC Output 13.6 to 14.7 Volts nominal, Current 25 Amps max (300 Watts)	
Signal INPUT	1 x engine running, plus multiple vehicle connections, sensor inputs for temperature & humidity	
Data IN / OUT	CAN Bus data communication and power to Control Panel via 6-way connector CAN Bus data communication and power to WLSUF-2/W-2 ultrasonic water level sensors via 4-way connectors CAN Bus data communication to LB100S lithium battery via 2-way connector CAN Bus data communication to DXC30-12 DC-DC charger via 4-way connector CI-Bus Data communication to CI-Bus enabled devices via RJ11/12 connector	
IP rating	IP31	

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Operating temperature	Ambient 0 to 35° Celsius Charger case temperature with full load 65° C Max	Automatic shutdown and restart if overheated / overloaded
Dimensions		
EC700PSU-CM Power Supply Unit	Overall size (HxWxD) 180 x 305 x 135mm Clearances 75mm above, 50mm left & right	Weight 3.8 Kg
EC970 Control Panel	Overall size (HxWxD) 122 x 190 x 25mm Cut-out size (HxW) 115 x 181mm	Fixing via hidden spring clips Weight 290g
PX310 Battery Charger	Overall size (HxWxD) 69 x 157 x 221mm	Weight 1.55 Kg
DXC30-12 DC-DC Charger	Overall size (HxWxD) 41 x 147 x 118mm	Weight 460g
LB100S Lithium Deep Cycle Battery	Overall size (HxWxD) 209 x 260 x 168mm	Weight 9.5 Kg
WLSUF-2 Ultrasonic Water Level Sensor	Overall size (HxWxD) 22 x 80 x 80mm	Weight 67g
WLSUW-2 Ultrasonic Water Level Sensor	Overall size (HxWxD) 22 x 80 x 80mm	Weight 67g
EC680-S5 Comms Module	Overall size (HxWxD) 36 x 87 x 56mm	Weight 170g
50001-18 Internal Temp & Humidity Sensor	Overall size (HxWxD) 60 x 27 x 14mm	Weight 10g
10005-26 External Temp Sensor	Overall size (HxWxD) 25 x 5 x 5mm	Weight 3g

5.2 Approvals

Power Supply Unit: Automotive Electro Magnetic Compatibility (EMC) to ECE Reg10.06, Type approval number E11 10 R 06 12228

Control Panel: Automotive Electro Magnetic Compatibility (EMC) to ECE Reg10.06, Type approval number E11 10 R 06 12232

Comms Module: Automotive Electro Magnetic Compatibility (EMC) to ECE Reg10.06, Type approval number E57 10 R 06 1126

System: BSEN 1648-1, BS EN1648-2 compliant, BS 7671: 2018 compliant

Residual Current Device: RCD 40A 30mA trip to BS EN 61008

Miniature Circuit Breakers: MCB's type C 6000A breaking capacity to BS EN 60898

Battery Charger: BS EN 60335-1/2.29, 2014/35/EU, BS 2014/35/EU, IEC61000-3.2/3:2018.1

Low Voltage Directive: 2014/35/EU, BS 2014/35/EU, TUV-014900-A1, EN55022, Class B, EN55024/ Level 2



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5.3 Declaration of Conformity

Equipment: Leisure Power Control System *Model name:* EC700PSU-CM, EC970, PX310, DXC30-12, LB100S, WLSUF-2, WLSUW-2, EC680-S5, 50001-18, 10005-26

I hereby declare that the equipment named above has been designed to comply with the relevant sections of the above referenced approvals. The unit complies with all essential requirements of the Directives.

Signed	Name	Position	Manufacturer
	I L Sargent	Technical Director	Sargent Electrical Services Ltd Unit 35, Tokenspire Business Park Woodmansey, Beverley East Yorkshire, United Kingdom
Date: 30/09/26			

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